Rebuttal notes, Clark Fire

Counsel has asked that I review defense expert reports and provide feedback. Following are three high-level observations offered in rebuttal.

Conductor contact at E1-E11

Defense experts conclude that the energized phase could not have made contact at the outer end of E11. This is based on a measured clearance of 78" when the conductor was at rest, and a measure of physical deflection of 48" when force was manually applied to the conductor in proximity to E11. The result is 30" of clearance. This conclusion based on static analysis fails to recognize two other dynamic factors:

1. Conductor displacement - Under calm conditions the maximum sag measured at mid-span was 80". This is based on a normal catenary curve. While it is true that conductor displacement would be reduced closer to a pole, the dynamic force of wind can induce oscillation (a.k.a. "gallop") which has the potential to increase deflection (a.k.a. "blow out") closer to the pole. Wind gusts of 80 mph would induce significant motion to the conductor.
2. Dynamic motion of branches – Wind gusts of 80 mph would have resulted in a great deal of dynamic motion in the crown of the subject tree. This includes branch E11, which at times would have been deflected closer to the conductor. Deflection of 30" would not be unusual during high winds.

Wind-induced deflection of both the conductor and branch together explains how contact could have been and likely was established at E1/E11.

Evidence of electrical contact

Defense experts opine that any electrical contact would have been intermittent, yet offer no basis for this observation. The extensive charring and loss of branch tissue at the union of E1/11 can only be explained by a persistent, high impedance electrical fault that continued for some time.

Defense experts also dismiss the evidence of current fault pathways, claiming that the "pin holes" observed are due to a pathogen. To the contrary – these are naturally occurring lenticels which are common features of small twigs A high impedance, relatively low current fault results in resistance heating, turning internal moisture to steam which erupts out these openings. As current continues to flow, charring occurs.

Presence of decay organisms

Defense experts focus on the presence of decay organisms on branches of the subject tree. This is not unusual. More to the point – the structural failure that occurred at E11 was not due to decay. It was due to the extensive loss of woody tissue that occurred during an active and persistent high impedance low current fault.

NERC FAC-003

Defense expert M. Neal cites a standard that is not relevant to this case.

- While the wind speed at the time of the incident clearly exceeded Beaufort Force 7, the fact remains that the subject tree did not experience structural failure due to the force of wind.
- NERC FAC-003 pertains specifically to vegetation management on the North American high voltage (≥200 kV) transmission grid. The 7.2 kV single phase distribution line that is involved in this incident is not part of the high voltage grid.

John W Goodfellow

Principal Consultant